

12-21-04

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

David BERMAN, et al.

Serial No.: 10/689,314

Filed: October 20, 2003

For: X-RAY REFLECTOMETRY OF THIN
FILM LAYERS WITH ENHANCED
ACCURACY



) Art Unit: 2882

) Examiner: (N/A)

) Washington, D.C.

) Docket No.: 22350/21

INFORMATION DISCLOSURE STATEMENT [IDS]

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

This Information Disclosure Statement is submitted in accordance with 37 C.F.R. 1.97, 1.98, and it is requested that the information set forth in this statement and in the listed documents be considered during the pendency of the above-identified application, and any other application relying on the filing date of the above-identified application or cross-referencing it as a related application.

☒ 1. This IDS should be considered, in accordance with 37 C.F.R. 1.97, as it is filed:

(Check one of the boxes A-D)

☐ A. within three months of the filing date of the above-identified national application or within three months of the entry into the national stage of the above-identified international application.

☒ B. before the mailing date of a first office action on the merits.

☐ C. after (A) and (B) above, but before final rejection or allowance, and Applicants have made the necessary certification (box "i" below) or paid the necessary fee (box "ii" below).

(check one of the boxes "i" and "ii" below:)

☐ i. Counsel certifies that, upon information and belief, each item of information listed herein was either (a) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS; or (b) was not cited in a communication from a foreign patent office in a counterpart foreign application and, to the knowledge of undersigned after making reasonable inquiry, was not known to any individual designated in 1.56(c) more than three months prior to the filing of this IDS.

"Express Mail" mailing label No.	EL 996367836 US
Date of Deposit:	December 20, 2004
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.	
Name:	Vivian Campbell
Signature:	<i>Vivian Campbell</i>

☐ ii. A check for the fee set forth in 1.17(p), presently believed to be \$240, is enclosed (check no. _____).

☐ D. after (A), (B) and (C) above, but before payment of the issue fee: Applicant petitions under 37 C.F.R. 1.97(d) for the consideration of this IDS. A check for the fee set forth in §1.17(i), presently believed to be \$130 is enclosed (check no. _____). Counsel certifies that, upon information and belief, each item of information listed herein was either (i) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS; or (ii) was not cited in a communication from a foreign patent office in a counterpart foreign application and, to the knowledge of the undersigned after making reasonable inquiry, was not known to any individual designated in 1.56(c) more than three months prior to the filing of this IDS.

☐ 2. In accordance with 37 C.F.R. 1.98, this IDS includes a list (e.g., form PTO-1449) of all patents, publications, or other information submitted for consideration by the office, either incorporated into this IDS or as an attachment hereto. A copy of each document listed is attached, except as explained below.

(check boxes A and/or B and fill in blanks, if appropriate.)

☐ A. Document(s) _____ is (are) deemed substantially cumulative to document(s) _____, and, in accordance with 1.98(c), only a copy of each of the latter documents is enclosed.

☐ B. Certain documents were previously cited by or submitted to the Office in the following prior application(s), which are relied upon under 35 U.S.C. 120:

[insert serial numbers and filing dates of prior applications]

Applicant identifies these documents by attaching hereto copies of the forms PTO-892 and PTO-1449 from the files of the prior application(s) or a fresh PTO-1449 listing these documents, and request that they be considered and made of record in accordance with 1.98(d). Per 37 CFR 1.98(d), copies of these documents need not be filed in this application.

☐ 3. Document(s) _____ is(are) not in the English language. In accordance with 1.98(c), Applicant states:

☐ An English translation of each document (or of the pertinent portions thereof), or a copy of each corresponding English-language patent or application, or English-language abstract (or claim) is enclosed.

☐ A concise explanation of the relevance of document(s) _____ is found in the attached search report (see reply to Comment 68 in the preamble to the final rules; 1135 OG 13 at 20).

☐ A concise explanation of the relevance of document(s) _____ is set forth as follows:
[Insert concise explanation of relevance]

☐ A concise explanation of the relevance of document(s) _____ can be found on page(s) _____ of the specification.

☐ A concise explanation of document(s) _____ can be found on the attached sheet.

4. No explanation of relevance is necessary for documents in the English language (see reply to Comments 67 and 68 in the preamble to the final rules; 1135 OG 13 at 20).

☐ 5. Other information being provided for the examiner's consideration follows:

6. In accordance with 37 C.F.R. 1.97(g) and (h), the filing of this IDS should not be construed as a representation that a search has been made or that information cited is, or is considered to be, material to patentability as defined in §1.56 (b), or that any cited document listed or attached is (or constitutes) prior art. Unless otherwise indicated, the date of publication indicated for an item is taken from the face of the item and Applicant reserves the right to prove that the date of publication is in fact different.

CROSS REFERENCE UNDER 37 C.F.R. §1.78 TO RELATED APPLICATIONS

Pursuant to 37 C.F.R. § 1.78, Applicant notes that the above-identified patent application may be related to the following U.S. Patent Applications:

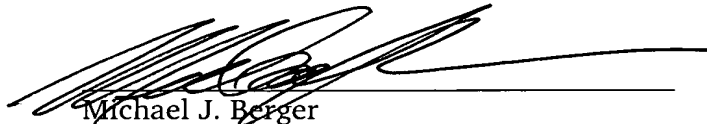
Please also acknowledge receipt of the enclosed documents by stamping the enclosed postcard and returning same to us.

Please charge any outstanding amount or credit of any overpayment to Deposit Account No. 01-1785.

A duplicate copy of this letter is enclosed.

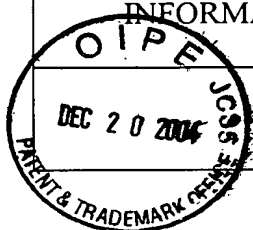
Respectfully submitted,

AMSTER, ROTHSTEIN & EBENSTEIN LLP


Michael J. Berger
Reg. No. 25,829

MJB:BMH/vc
Encls.

FORM PTO-1449 (Colb)	ATTY DOCKET NO. 22350/21	SERIAL NUMBER 10/689,314
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANTS' INFORMATION STATEMENT	APPLICANT David BERMAN, et al.	EXAMINER (N/A)
	FILING DATE October 20, 2003	GROUP ART UNIT 2882



U.S. PATENT DOCUMENTS

Examiner's Initials		DOCUMENT NO.	DATE	NAME	CLASS	SUB	FILING DATE
	AA	2004/0218717					
	AB	6,813,338					
	AC						

FOREIGN PATENT DOCUMENTS

		DOCUMENT NO.	DATE	COUNTRY	CLASS	SUB	TRANS- LATION
	AD						


OTHER ART (Including Author, Bills, Pertinent Pages, Etc.)

	AE	Chihab et al., "New Apparatus for Grazing X-Ray Reflectometry in the Angle-Resolved Dispersive Mode", Journal of Applied Crystallography 22 (1989), p. 460.
	AF	XTF5011 Tube, Produced by Oxford Instruments of Scotts Valley, California. June 1999.
	AG	Doubly-Bent Focusing Crystal Optic, Produced by XOS Inc., of Albany, New York. July 2000.
	AH	Model S7032-0908N array, Produced by Hamamatsu, of Hamamatsu City, Japan. May 2000.
	AI	J. Spear, "Metrology for low-k materials", Silknet Alliance, 2003.
	AJ	J.R. Levine Parrill, et al, "GISAXS - Glancing Incidence Small Angle X-ray Scattering", Journal de Physique IV 3 (December 1993), pages 411-417.
	AK	Jaklevic, et al., "High Rate X-Ray Fluorescence Analysis by Pulsed Excitation", IEEE Transactions on Nuclear Science NS-19:3 (1972), pp. 392-395.
	AL	Jaklevic, et al., "Small X-Ray Tubes for Energy Dispersive Analysis Using Semiconductor Spectrometers", Advances in X-Ray Analysis 15 (1972), pp. 266-275.

EXAMINER:

DATE CONSIDERED:

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 (Colb)	ATTY DOCKET NO. 22350/21	SERIAL NUMBER 10/689,314
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U.S. PATENT DOCUMENTS

Examiner's Initials		DOCUMENT NO.	DATE	NAME	CLASS	SUB	FILING DATE
	AA						
	AB						
	AC						

FOREIGN PATENT DOCUMENTS

		DOCUMENT NO.	DATE	COUNTRY	CLASS	SUB	TRANS- LATION
	AD						

OTHER ART (Including Author, Bills, Pertinent Pages, Etc.)

AE	Jaklevic, et al., "Energy Dispersive X-Ray Fluorescence Spectrometry Using Pulsed X-Ray Excitation", <i>Advances in X-Ray Analysis</i> 19 (1976). pp. 253-265.
AF	Wormington, Characterization of Pore Size Distribution in Low k Dielectrics Using X-ray Reflectivity", presented at the Sematech Gate Stack Engineering Workshop (Austin, Texas, May 2, 2002).
AG	Ito, "X-ray Scattering Method for Determining Pore-Size Distribution in Low-k Thin Films", Presented at the International Sematech Ultra-Low-k Workshop (San Francisco, CA, June 6-7, 2002).
AH	N. Wu, et al, "Substepping and its Application to HST Imaging", 28-7-2003.
AI	G. Wiener, et al., "Characterization of Titanium Nitride Layers By Grazing-Emission X-ray Fluorescence Spectrometry," pp. 129-136.
AJ	
AK	
AL	

EXAMINER:

DATE CONSIDERED:

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.